

Listing of the Claims:

The following is a complete listing of all the claims in the application, with an indication of the status of each:

- 1 1 (Previously Presented). An image comparison system comprising:
 - 2 means for inputting three-dimensional data of an object;
 - 3 reference image storing means for storing a reference image of at least one reference object;
 - 5 pose candidate deciding means for generating a plurality of pose candidates;
 - 7 comparison image generating means for generating, for the reference image for the at least one object, a comparison image close to the reference image, said generating including projecting the three-dimensional data onto a two-dimensional image in accordance with each of the plurality of pose candidates to generate a plurality of comparison images and calculating, for each of the plurality of comparison images, the minimum distance between the comparison image and the reference image and selecting, as the comparison image close to the reference image, the comparison image having the smallest minimum distance;
 - 16 reference correction coefficient storing means for storing a correction coefficient corresponding to the reference image;
 - 18 image comparing means for determining one of a minimum distance value and a maximum similarity degree between the reference image and the generated comparison images; and
 - 21 correcting means for correcting, based on the correction coefficient, one of the minimum distance value and the maximum similarity degree determined by the image comparing means,
 - 24 wherein the image comparing means performs a comparison between the reference image and each of the generated comparison images on the basis

26 of one of the minimum distance value and the maximum similarity degree
27 corrected by the correcting means and, based on a result of the comparison,
28 identifies whether a match exists between any of the generated comparison
29 images and of the reference image.

1 2. (Previously presented) The image comparison system of claim 1, wherein
2 said image comparing means identifies whether a match exists based on a
3 comparison between the minimum distance value between the reference image
4 and the generated comparison image and a threshold value and a result of
5 comparison between the maximum similarity degree between the reference
6 image and the generated comparison image and a threshold value.

1 3. (Previously presented) The image comparison system of claim 1,
2 wherein said reference image storing means stores a reference image
3 for each of a plurality of objects,
4 wherein said comparison image generating means generates, for each
5 of the reference images, a comparison image close to the reference image, and
6 said image comparing means comprises:
7 calculating means for calculating, for each of the reference
8 images, one of a distance value and a similarity degree between the reference
9 image and the generated comparison image close to the reference image;
10 selecting means for selecting, for each of the reference images,
11 one of a minimum distance value which is a smallest distance value and a
12 maximum similarity degree which is a largest similarity degree for each
13 reference image; and
14 comparing means for outputting, as a comparison result, one of
15 a reference image including a smallest minimum distance value which is a
16 smallest one of minimum distance values and a reference image including a
17 largest maximum similarity degree which is a largest one of maximum

18 similarity degrees.

4. (Cancelled)

1 5. (Previously presented) The image comparison system of claim 1, further
2 comprising reference weighting coefficient storing means for storing a
3 weighting coefficient corresponding to the reference image,

4 said image comparing means comprising calculating means for
5 calculating one of the distance value and the similarity degree between the
6 reference image and the comparison image based on the weighting coefficient
7 corresponding to the reference image.

1 6. (Previously presented) The image comparison system of claim 1 further
2 comprising:

3 standard three-dimensional reference point storing means for storing a
4 standard three-dimensional reference point corresponding to a standard
5 three-dimensional object model;

6 standard three-dimensional weighting coefficient storing means for
7 storing a standard three-dimensional weighting coefficient;

8 three-dimensional reference point extracting means for extracting a
9 three-dimensional reference point from the input three-dimensional data; and

10 input weighting coefficient converting means for obtaining a
11 coordinate correspondence of the standard three-dimensional weighting
12 coefficient to the three-dimensional data based on the standard
13 three-dimensional reference point and the three-dimensional reference point of
14 the three-dimensional data, and converting the standard three-dimensional
15 weighting coefficient into a two-dimensional weighting coefficient in
16 accordance with the pose candidate,

17 said image comparing means comprising calculating means for

18 calculating one of the distance value and the similarity degree between the
19 reference image and the comparison image based on the converted
20 two-dimensional weighting coefficient.

1 7. (Previously presented) The image comparison system of claim 1, further
2 comprising:

3 representative three-dimensional object model storing means for
4 storing representative ones of three-dimensional object models as
5 representative three-dimensional object models;
6 group storing means for storing related information of the
7 representative three-dimensional object models and reference images;
8 three-dimensional comparing means for comparing the input
9 three-dimensional data with the representative three-dimensional object
10 models, and selecting a representative three-dimensional object model similar
11 to the three-dimensional data; and

12 reference image selecting means for selecting a reference image
13 corresponding to the selected representative three-dimensional object model
14 by referring to the related information,

15 wherein said image comparing means compares the selected reference
16 image with the input three-dimensional data.

1 8. (Previously presented) The image comparison system of claim 1, further
2 comprising:

3 representative image storing means for storing representative ones of
4 images as representative images;
5 group storing means for storing related information of the
6 representative images and reference images;
7 representative image selecting means for comparing the input
8 three-dimensional data with the representative images, and selecting a

9 representative image similar to the three-dimensional data; and
10 reference image selecting means for selecting a reference image
11 corresponding to the selected representative image by referring to the related
12 information,
13 wherein said image comparing means compares the selected reference
14 image with the input three-dimensional data.

1 9. (Currently Amended) The image comparison system of claim ~~4~~ 1,
2 wherein the correction coefficient is determined on the basis of at least one of
3 a distance value and a similarity degree between a representative
4 three-dimensional object model and the reference image.

1 10. (Previously Presented) An image comparison method for identifying a
2 match of an object to a stored reference image of at least one object,
3 comprising steps of:
4 inputting three-dimensional data of an object;
5 generating at least one pose candidate as a candidate for pose of the
6 object;
7 generating, for the reference image of the at least one object, a
8 comparison image close to the reference image, said generating including
9 projecting the three-dimensional data onto a two-dimensional image in
10 accordance with each of the plurality of pose candidates to generate a plurality
11 of comparison images and calculating, for each of the plurality of comparison
12 images, the minimum distance between the comparison image and the
13 reference image and selecting, as the comparison image close to the reference
14 image, the comparison image having the smallest minimum distance;
15 storing a correction coefficient corresponding to the reference image;
16 identifying whether a match exists between the generated comparison
17 image and the reference image, said identifying including determining one of a

18 minimum distance value and a maximum similarity degree between the
19 reference image and the generated comparison images; and
20 correcting, based on the correction coefficient, one of the minimum
21 distance value and the maximum similarity degree determined by the
22 identifying step,
23 wherein the step of identifying whether a match exists includes
24 performing a comparison between the reference image and each of the
25 generated comparison images on the basis of one of the minimum distance
26 value and the maximum similarity degree corrected by the correcting step and,
27 based on a result of the comparison, identifying whether a match exists
28 between any of the generated comparison images and of the reference image.

1 11. (Previously presented) The image comparison method of claim 10,
2 wherein the step of identifying whether a match exists includes performing
3 one of a comparison between the minimum distance value between the
4 reference image and the generated comparison image and a threshold value
5 and a comparison between the maximum similarity degree between the
6 reference image and the generated comparison image and a threshold value.

1 12. (Previously presented) The image comparison method of claim 10,
2 wherein the step of generating a comparison image comprises the step
3 of generating a comparison image close to each reference image for each of a
4 plurality of objects; and
5 wherein the step of identifying whether a match exists comprises the
6 steps of:
7 calculating, for each of the reference images, one of a distance value
8 and a similarity degree between the reference image and the generated
9 comparison image close to the reference image;
10 selecting, for each of the reference images, one of a minimum distance

11 value which is a smallest distance value and a maximum similarity degree
12 which is a largest similarity degree for each reference image; and
13 outputting, as a comparison result, one of a reference image including
14 a smallest minimum distance value which is a smallest one of minimum
15 distance values and a reference image including a largest maximum similarity
16 degree which is a largest one of maximum similarity degrees.

1 13. (Previously presented) The image comparison method of claim 10, further
2 comprising the step of correcting one of the minimum distance value and the
3 maximum similarity degree based on a correction coefficient corresponding to
4 the reference image.

1 14. (Previously presented) The image comparison method of claim 10,
2 wherein the step of identifying whether a match exists comprises the step of
3 calculating one of the distance value and the similarity degree between the
4 reference image and the comparison image based on a weighting coefficient
5 corresponding to the reference image.

1 15. (Previously presented) The image comparison method of claim 10, further
2 comprising the steps of:
3 extracting a three-dimensional reference point from the input
4 three-dimensional data; and
5 obtaining a coordinate correspondence of a standard three-dimensional
6 weighting coefficient to the three-dimensional data by using a standard
7 three-dimensional reference point corresponding to a standard
8 three-dimensional object model and the three-dimensional reference point of
9 the three-dimensional data, and converting the standard three-dimensional
10 weighting coefficient into a two-dimensional weighting coefficient in
11 accordance with the pose candidate,

12 wherein the step of identifying whether a match exists comprises the
13 step of calculating one of the distance value and the similarity degree between
14 the reference image and the comparison image based on the converted
15 two-dimensional weighting coefficient.

1 16. (Previously presented) The image comparison method of claim 10, further
2 comprising the steps of:

3 comparing the input three-dimensional data with representative
4 three-dimensional object models which are representative ones of
5 three-dimensional object models, and selecting a representative
6 three-dimensional object model similar to the three-dimensional data; and
7 selecting a reference image corresponding to the selected
8 representative three-dimensional object model by referring to information
9 indicating relations between the representative three-dimensional object
10 models and reference images,

11 wherein the step of identifying whether a match exists comprises the
12 step of comparing the selected reference image with the input
13 three-dimensional data.

1 17. (Previously presented) The image comparison method of claim 10, further
2 comprising the step of:

3 comparing the input three-dimensional data with representative images
4 which are representative ones of images, and selecting a representative image
5 similar to the three-dimensional data; and
6 selecting a reference image corresponding to the selected
7 representative image by referring to information indicating relations between
8 the representative images and reference images,

9 wherein the step of identifying whether a match exists comprises the
10 step of comparing the selected reference image with the input

11 three-dimensional data.

1 18. (Previously presented) The image comparison method of claim 13, further
2 comprising the step of determining the correction coefficient on the basis of at
3 least one of a distance value and a similarity degree between a representative
4 three-dimensional object model and the reference image.

1 19. (Previously Presented) A computer readable medium storing a computer
2 program that, when executed by the computer, causes the computer to execute:
3 a procedure of inputting three-dimensional data of an object;
4 a procedure of generating at least one pose candidate as a candidate for
5 pose of the object;

6 a procedure of generating, for the reference image of the at least one
7 object, a comparison image close to the reference image, said generating
8 including projecting the three-dimensional data onto a two-dimensional image
9 in accordance with each of the plurality of pose candidates to generate a
10 plurality of comparison images and calculating, for each of the plurality of
11 comparison images, the minimum distance between the comparison image and
12 the reference image and selecting, as the comparison image close to the
13 reference image, the comparison image having the smallest minimum
14 distance;

15 a procedure of storing a correction coefficient corresponding to the
16 reference image;

17 a procedure of identifying whether a match exists between the
18 generated comparison image and the reference image, said identifying
19 including determining one of a minimum distance value and a maximum
20 similarity degree between the reference image and the generated comparison
21 images; and

22 a procedure of correcting, based on the correction coefficient, one of

23 the minimum distance value and the maximum similarity degree determined
24 by the procedure of identifying whether a match exists,

25 wherein the procedure of identifying whether a match exists includes a
26 procedure of performing a comparison between the reference image and each
27 of the generated comparison images on the basis of one of the minimum
28 distance value and the maximum similarity degree corrected by the procedure
29 of correcting and, based on a result of the comparison, identifying whether a
30 match exists between any of the generated comparison images and of the
31 reference image.

1 20. (Previously Presented) The computer readable storage medium of claim
2 19, wherein the computer program, when executed by the computer in the
3 procedure of identifying whether a match exists causes the computer to
4 execute:

5 a procedure of one of a comparison between the minimum distance
6 value between the reference image and the generated comparison image and a
7 threshold value and a comparison between the maximum similarity degree
8 between the reference image and the generated comparison image and a
9 threshold value.

1 21. (Previously presented) The computer readable storage medium of claim
2 19, wherein the computer program, when executed by the computer in the
3 procedure of generating a comparison image, causes the computer to execute a
4 procedure of generating a comparison image close to each reference image for
5 each of a plurality of objects, and

6 in the procedure of identifying whether a match exists causes the
7 computer to execute:

8 a procedure of calculating, for each of the reference images, one of a
9 distance value and a similarity degree between the reference image and the

10 generated comparison image close to the reference image;
11 a procedure of selecting, for each of the reference images, one of a
12 minimum distance value which is a smallest distance value and a maximum
13 similarity degree which is a largest similarity degree for each reference image;
14 and

15 a procedure of outputting, as a comparison result, one of a reference
16 image including a smallest minimum distance value which is a smallest one of
17 minimum distance values and a reference image including a largest maximum
18 similarity degree which is a largest one of maximum similarity degrees.

1 22. (Previously presented) The computer readable storage medium of claim
2 19, wherein the computer program, when executed by the computer further
3 causes the computer to execute a procedure of correcting one of the minimum
4 distance value and the maximum similarity degree based on a correction
5 coefficient corresponding to the reference image.

1 23. (Previously Presented) The computer readable storage medium of claim
2 19, wherein the computer program, when executed by the computer in the
3 procedure of identifying whether a match exists, performing comparison, the
4 program causes the computer to execute a procedure of calculating one of the
5 distance value and the similarity degree between the reference image and the
6 comparison image by using a weighting coefficient corresponding to the
7 reference image.

1 24. (Previously presented) The computer readable storage medium of claim
2 19, wherein the computer program, when executed by the computer further
3 causes the computer to execute:
4 a procedure of extracting a three-dimensional reference point from the
5 input three-dimensional data; and

6 a procedure of obtaining a coordinate correspondence of a standard
7 three-dimensional weighting coefficient to the three-dimensional data by using
8 a standard three-dimensional reference point corresponding to a standard
9 three-dimensional object model and the three-dimensional reference point of
10 the three-dimensional data, and converting the standard three-dimensional
11 weighting coefficient into a two-dimensional weighting coefficient in
12 accordance with the pose candidate,

13 wherein in the procedure of performing comparison, the program
14 causes the computer to execute a procedure of calculating one of the distance
15 value and the similarity degree between the reference image and the
16 comparison image by using the converted two-dimensional weighting
17 coefficient.

1 25. (Previously presented) The computer readable storage medium of claim
2 19, wherein the computer program, when executed by the computer further
3 causes the computer to execute:

4 a procedure of comparing the input three-dimensional data with
5 representative three-dimensional object models which are representative ones
6 of three-dimensional object models, and selecting a representative
7 three-dimensional object model similar to the three-dimensional data; and

8 a procedure of selecting a reference image corresponding to the
9 selected representative three-dimensional object model by referring to
10 information indicating relations between the representative three-dimensional
11 object models and reference images,

12 wherein in the procedure of performing comparison, the program
13 causes the computer to execute a procedure of comparing the selected
14 reference image with the input three-dimensional data.

1 26. (Previously presented) The computer readable storage medium of claim
2 19, wherein the computer program, when executed by the computer further
3 causes the computer to execute:

4 a procedure of comparing the input three-dimensional data with
5 representative images which are representative ones of images, and selecting a
6 representative image similar to the three-dimensional data; and

7 a procedure of selecting a reference image corresponding to the
8 selected representative image by referring to information indicating relations
9 between the representative images and reference images,

10 wherein in the procedure of performing comparison, the program
11 causes the computer to execute a procedure of comparing the selected
12 reference image with the input three-dimensional data.

1 27. (Previously presented) The computer readable storage medium of claim
2 22, wherein the computer program, when executed by the computer further
3 causes the computer to execute a procedure of determining the correction
4 coefficient on the basis of at least one of a distance value and a similarity
5 degree between a representative three-dimensional object model and the
6 reference image.